Representation of EPG Programming Information

The invention relates to the representation of information visually and particularly, although not necessarily exclusively, the provision of information in the form of

5   programming information such as that provided as part of an Electronic Programme Guide (EPG). The invention relates to the format of the EPG display and particularly the provision of additional user selectable functions and applications, which can be made from the display. Although the invention is described with reference to the EPG this does not and should not be interpreted as, limiting the scope of the invention.

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An EPG is generated as a graphic interface on a display screen and is generated by a broadcast data receiver from data broadcast by and received from one or a number of service providers. The EPG can show a range of programme or function related information at least some portions of which can be selected by the user to obtain further information or to

15   perform certain functions. The user typically navigates through the EPG by making a series of selections via appropriate control means, typically a remote control device. The use of the device and interaction with the broadcast data receiver (BDR) allows movement about the screen and through different display layers.

20   In this description the term "a level of choice" is used to refer to a menu option which is accessible by the user through navigation in the graphic user interface, "a level of select" is used to define the press of an action key on a control means such as a remote control device that executes the choice. A "user input device" is any control means provided to the user for
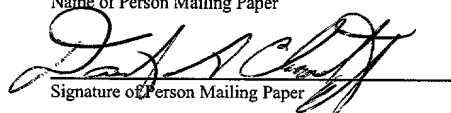
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control of the BDR, most commonly a remote control unit or the front panel keys, and "navigation keys" are the directional keys on the user input device; such as Up, Down, Left, Right, Page up, Page down.

5   A conventional EPG presents the programming info with two level of user choice in a two dimensional space. (Time versus Channel, Channel versus Time, Theme versus Channel, etc). Normally the choices are mapped to x and y co-ordinates in a grid function on the screen and to the navigation buttons on the user input device.

10   A change in x-coordinate, performed by operation of (left/right arrows) changes the user's choices in the y direction. Movement in the y direction (up/down arrows, page up/down) chooses a selectable program. This gives the user two levels of choice with one level of selection. The two dimensional grid with rows and columns, is one particular embodiment of this.

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While this system allows beneficial and effective use of the two dimensional space, a limitation of this approach is the two dimensional graphic interface and the limited number of navigational keys on the user input device which can be used. When the user wants another view, he/she has to press another "menu-mapped" button on the remote control. There are

20   two known methods to perform this function, which are either to have remote control keys mapped directly to different pages of the EPG, such that depression of a particular key causes the generation of a particular EPG display and/or to have one button bring up a menu/list of all available menus of the EPG. In the latter of these opinions there is a need for an additional level of user selection before the desired list of choices is shown.

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In the present invention, this is accomplished by pressing the Page +/- button. Each time the Page button is pressed, the highlighted Tab will become the Tab above (Page+) or below (Page -) the currently highlighted Tab. The Page +/- button will move one through the defined graphical tabs. With the movement onto each tab the associated function, data or

application becomes active. This movement onto a tab will activate the associated function, data or application and in doing will provide additional x/y/z choices as per the newly activated function, data or application. The second display presents the information which is in the z axis, and this information is the new function, data, or application to which the Tab

5   is connected. This connection is performed with a software program that is activated through the Page button and works with a list of software functions, data sets, or applications.

The aim of the present invention is to overcome the limitations of the two dimensional interface of the conventional EPG display to facilitate improved use of the EPG.

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In a first aspect of the invention there is provided an interactive graphics interface for display on a television screen said graphics interface generated from a plurality of data fields and characterised in that the graphics interface has at least three navigational axes, comprising a first display which displays a portion of one of the data fields and allows user

15   navigation along X and Y axis of the same and a second display portion which represents a number of functions, applications or data fields and effectively allows navigation along the Z axis of said data fields.

In one embodiment the first and second display portions are generated as an

20   electronic programme guide (EPG) on a display screen.

Typically navigation along the second display portion allows the selection of the data field from which the first display is generated.

25   In one embodiment each of the three axes are selectively navigable by the user via a user input device, typically a remote control device.

In use navigation along a selected axis allows a definable range of options to be selected, said option range indicated as part of the EPG display.

By adding a third navigational axis and providing the user with the means to navigate along this axis using existing navigational keys and providing the user with the means to navigate along this axis using existing navigational keys (The Page +/- key presses generate signals that are received by the STB and cause software routines to execute. These routines change the Tab graphics and perform work to activate or load other software functions, data, or applications. These functions, data, or applications can come for the Headend or reside within the Set Top Box. They are associated or mapped to the graphical tab representation through software data structures.) a new range of user options can be selected from the single graphics display, thus eliminating the need for a separate interface to be generated and the need for an additional user selection.

The Headend passes data structures in files over a broadcast data carrousel. One of these files contain service IDs that are associated with software functions, data, or applications. Software on the STB creates graphical Tabs to display within the EPG and binds them to these functions, data, or applications.

In one embodiment there is provided a z axis which is allocated to show, and allow selection of additional functions and applications which may then utilize the x axis and y axis navigation within there own context.

By performing the invention so the amount of user choice is increased to three without increasing the select levels required to be performed by the user to select a particular function.

Specific embodiments of the invention are now described with reference to the accompanying drawings wherein:-

Figure 1 illustrates in schematic fashion a conventional, prior art, display format;

Figures 2 and 3 illustrate stages of the current invention involving the use of navigation axes;

Figure 4 illustrates the expansion of a conventional EPG decision tree in accordance with the invention; and

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Figure 5 shows an on-screen view of an EPG in accordance with one embodiment of the invention.

10   Referring firstly to Figure 1 there is illustrated the conventional approach to the format of an EPG display. In practice the screen view 2 is a part of a larger EPG graphics display page of information 4. When the user wishes to view another portion of the page, the directional keys move the view area 2 around on the page 4 as required by the user, in the x and y axis, 6, 8.

15   Now looking at the invention of this application, a third axis 10, is provided and this is used to extend the EPG information which can be selected into three dimensions. This is achieved by the decision to stack multiple data fields or pages pages 4, 12, 14 as shown in figure 2. Movement on the page 4 remains mapped to movement along the x- and y-axes, but there is now the additional option of movement between pages 4, 12, 14 and which

20   movement is mapped to movement along the z-axis.

The visual representation of the z-axis can be added as a second display portion as an independent view of a row or column of choices (menu bar) 16 as indicated in Figure 3 as part of the display screen view and as shown in more detail in Figure 5. The movement in

25   the z direction is indicated by movement of a cursor along the member 16.

To avoid the need for additional select levels, a separate set of keys can be mapped or re-mapped to control and provide movement options along the z-axis. The Z axis navigation only requires one key press. All other EPGs require that one navagate to the 'next' z axis

item and then press a select key to invoke the new item (where "item" is either software functions, data, or applications).

Movement in the z-direction changes the view of choices in the first display portion, x-y plane, and movement in the x-direction changes the choices in the y-direction. As in a conventional EPG implementation, the lowest level of choice, choice of a specific program, is in the y direction.

The organisation of choices and data in a traditional EPG can be represented as a 2 level decision tree 20 as shown in Figure 4. A third layer of decision requires an additional level 22 in the tree as shown in figure 4. In this example, in an EPG, the chosen object will always be a channel. The objects of choice can be presented to the user in any graphic form (line, row, image, etc).

By indexing the EPG programming information rather than sorting, there is never a need to reorganise the information. If desired, the programming information can be stored in a flat unsorted array and the data is parsed and indexed as it comes in. The indexes are in turn mapped to the choices along the x-, y- and z-axes 6, 8, 10 respectively. Indexing rather than sorting decreases the necessity of resorting or having multiple copies of the same data.

The representation of programming information in accordance with the invention eliminates the need for mapping remote control buttons to the user configurable keys. These keys can then be ignored, or removed, thus simplifying the remote control, or are used to allow access to other broadband services such as yellow pages, shopping, communication, etc.

For other graphics interfaces such as those used, for example, for broadband services the 3 layers of choice can be used to give the user faster access to the desired object within that service, and it should be appreciated that reference in this application to the display and

utilisation of the invention can be repeated to advantage in any appropriate graphic user interface.

A specific example of the invention is described where an Electronic Programme Guide is visually represented as an almanac with a tab for each page, as indicated in Fig. 3. The tabs are placed vertically on the right hand side of the display and indicate motion and choices in the z-direction.   The movement between pages is mapped to the page up and page down buttons on the user interface device.   The arrow keys (left, right, up, down) are mapped to motion in the x-y plane as in a conventional EPG.   In order to maintain the ability to scroll faster on a page, the action of continuous hold is mapped to an arrow button to fast scrolling.   This replaces the need for using page up and page down for manoeuvring in the x-y plane.

All programming data is presented as lines in a column where motion in the x-direction changes the content of the column and motion in the y direction moves the cursor up and down between available programs.

In the mapping of the EPG data to the three dimensional space the axes are mapped in the following manner:

Z = Page   = Sorting method/programme type
Y = Column   = Sort index
X = Line   = Programme

The settings function can also be adapted so that, for example, for another form of graphics interface such as a display for service access and payment facilities with three layers of choice, the x, y and z co-ordinates can be mapped this way:

Z = Page   = Settings functions (Payment, output,

parental control, etc)

Y = Column   = Setting (Method of payment)

X = Line   = Options for setting (credit card, direct

withdrawal, bill me)

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In the present invention, by mapping a third pair of keys the user can maneuver

freely in the three dimensions without pressing a select key. Typically in a menu one

navigates in a x-y plane. To attain a third level of choice, one has to perform a select action

that brings one a level down the selection tree. Then to get back to, or change, the current top

10   level, one has to traverse back up the tree by a select action before another top level choice

can be made.

In the present invention, one can navigate all three levels without traversing back.

For example, page up/down command will always switch top level, while the left arrow

15   navigates the second level and the up/down command controls the third level.

The subject invention is not limited to navigating a 3 dimensional tree, but can be

expanded to n dimensions depending on the branches in the incoming data structure and the

number of keys available on the navigation device (remote control) to map to navigation

20   along each of the n axes.

In one embodiment of the present invention, a four level navigation is provided in

which the Page up/down control brings one up/down in top the level; the Line up/down

control brings one up/down in the second level presented as a left column of grouped data;

25   and from the left hand menu one can press the Select command that brings one to the third

level of navigation (This also changes the up/down arrow command to navigate in the

fourth dimension).

The data either resides on the set top box or comes to the box in table form. The EPG

uses standard service protocol tables where a table or a portion of the table is mapped to a tab, with the sorting of the table to column headers, the table entries to column lines, and descriptors to fields in the view (the channel descriptor in the upper left with program descriptor below, and with the full program information descriptor to an information overlay that is activated by the information key). Individual tabs can be mapped to service tables or portions of service tables. The content and/or application can reside on the set top box, on the head end, an application server, a web server (html), internet,or anywhere where the set top box can communicate. Examples include MOD as an embedded resident application mapped to a tab, and the music tab mapped to a specific url within the standard protocol.